A CONTRIBUTION TO THE ZOOLOGY OF NEW CALEDONIA.

By J. Douglas Ogilby.

"On sait que les eaux douces de la Nouvelle-Calédonie renferment diverses espèces de Poissons, mais ils ne paraissent pas avoir été étudiés jusqu'ici."

Crosse, Journ. Conch. Vol. xlii. (1894), p. 446.

The paragraph here reproduced gives the sum total of the information at present procurable about the fishes of this island, and it was in order to partially remedy this neglect that I took advantage of the decision of my friend and colleague Mr. Charles Hedley—on whose unvarying kindness and readiness to forward scientific work of any description I need not here dilate—to spend a short holiday in New Caledonia, to request him to procure for me any fishes which he might find time to collect, especially impressing upon him the interest which would attach to the fresh-water forms. Mr. Hedley spent about a month on the island, and though, owing to the meagre time at his disposal he was unable to pay any attention to the marine fish fauna, he nevertheless found time to spare from his own especial pursuits to make a collection from fresh-water streams, which is all the more valuable because of the care which has so evidently been taken in its preservation, and which has enabled him to place it in my hands in an absolutely perfect condition. The collection numbers no less than seventy-two specimens, representing six species and as many genera, reference to which will be made below.

A few words as to the position, history, and general features of the island may not be out of place here :—

New Caledonia is situated in the western portion of the South Pacific Ocean, roughly speaking between the parallels of 20° to

to 22° 30′ S. lat. and 164° to 167° E. long., and has an area of 6,450 square miles, with a population of about 62,750.

"The natives of New Caledonia," Mr. Hedley tells me, "are Melanesians allied to the Fijians; in former days they were, like kindred races, inveterate cannibals; civilised rule has now, however, stamped out this. Some years ago they made a vigorous attempt to strike off the French yoke, but the insurrection was crushed after much bloodshed Now military posts are distributed throughout the island, and there is no danger of any serious disturbance. The natives are rapidly diminishing in numbers, and their total disappearance seems to be a matter of the near future."

Notwithstanding that the island has now been for forty-four years under the dominion of France, a nation which justly prides itself on its scientific attainments, it is astonishing how little has been done to elucidate the fauna of this interesting colony; and in no branch is this neglect more apparent than in ichthyology, the study of all others, among the chordates at all events, which, one would think, should have commended itself to the notice of the residents.

A glance over the introduction to Crosse's paper convinces us that this favoured region, though so long settled and so comparatively close to the scientific centres of Australia, is still almost virgin ground to the biologist; it is hoped that the present short notice will draw attention to so important a subject, and induce some resident of the island to either provide us with a list of the species of fishes inhabiting its waters or forward collections to some recognised authority.

I do not anticipate the presence of any startling novelties, but the position of the island should make the study of its fauna and flora of great interest.

Mr. Hedley has kindly supplied me with the following interesting information:—

"On passing along the east coast a marked change is noticed when the traveller leaves the serpentine rocks, which yield the

nickel ore, and reaches the palæozoic formation succeeding them to the northward. The former are bleak and barren, with desolate uplands of bare red soil, patches of scanty fern, and thin brush-wood, which, seen from the coasting steamer, suggest by their lifelessness the polar rather than the tropic zone. The latter rise wall-like from the sea, towering in Mt. Panic, the culminating peak of the island, to a height of about 5,400 feet. The crest of the range is clothed with dense jungle, its sides seamed with white leaping cataracts, and at its feet lie populous native villages hidden in cocoa-nut palm groves, the taro gardens of the kanakas, and the coffee plantations of the colonists.

"Twenty miles north of Mt. Panic, where the altitude of the coast range has diminished, lies the little settlement of Oubatche. Here, by the kind assistance of my hosts, Messrs. A. O. and J. Henry, I was enabled to collect the fresh-water fishes enumerated below. Our method was simply to block a small rivulet which flowed through an abandoned native garden in an alluvial flat near the sea, and bale a pool dry with buckets. As the water drained away the fish fell easy victims to the active native lads and were then transferred to my jar of formal. The small series of fish obtained did not of course exhaust the fauna of the neighbourhood. I saw several other kinds in the shallow streams which I was unable to catch, and I should expect that the mountain pools at higher levels, from two to four thousand feet, would yield different, perhaps peculiar species.

"On our arrival I observed two kinds of *Halobates* skimming over the surface of the pool, but they evaded my efforts to secure them. The molluscan tenants of the pool were *Isodora nasuta* and *Succinea montrouzieri* among the weeds, *Neritina variegata*, *N. canalis*, *N. bruguieri*, *N. petiti*, and *Navicella bougainvillei* were clinging to the rocks, and when the water fell *Melania arthurii* was seen crawling in the mud. Among crustacea, *Palæmon vagus* was plentiful, and a fresh-water crab, *Hymenosoma pilosa*, was caught. A spider, *Dolomedes* sp., was left among the water plants when the water subsided."

Anguilla sp.

The four specimens of fresh-water eels brought back by Mr. Hedley form an excellent working series, as they vary in size from 236 to 647 millimeters. There can be no doubt as to the specific identity of these four, but the series proves to be of more than ordinary interest as a means of demonstrating the insignificance of some of the characters which have been considered of the highest importance in the determination of species among these fishes. Omitting all reference to such characters as are dependent upon the size of the eye, since it is now understood that this is co-ordinate with the degree of development to which the sexual organs have attained in each individual, I submit the following analysis, showing the principal differences which exist between the larger New Caledonian specimen and the three smaller ones.

Specimen *a*, 647 millimeters.

Head $6\frac{2}{3}$ in the total length, $1\frac{9}{10}$ in the trunk, $\frac{1}{10}$ *more* than the space between the gill-opening and the origin of the dorsal, and $\frac{1}{5}$ *less* than the distance between the latter and the vent; cleft of mouth 3 in the length of the head; space between origin of dorsal and tip of snout $3\frac{3}{4}$ in the total length; pectoral $3\frac{1}{5}$ in the head.

Specimens *b-d*; 236-345 millimeters.

Head $7\frac{1}{5}$ to $7\frac{2}{5}$ in the total length, 2 to $2\frac{1}{4}$ in the trunk, $\frac{1}{4}$ to $\frac{1}{2}$ *less* than the space between the gill-opening and the origin of the dorsal, and $\frac{1}{9}$ to $\frac{2}{9}$ *more* than the distance between the latter and the vent; cleft of mouth $3\frac{1}{2}$ to $3\frac{1}{5}$ in the length of the head; space between origin of dorsal and tip of snout $2\frac{9}{10}$ to $3\frac{1}{5}$ in the total length; pectoral $3\frac{9}{10}$ to $4\frac{1}{5}$ in the head.

In all the specimens the lateral bands of maxillary and mandibular teeth are divided into two sections by a naked longitudinal groove, the outer section consisting of a single series of enlarged, closely set, cutting teeth—similar to those of *Leptocephalus*—with the occasional addition, in the younger examples, of a limited

number of irregularly set smaller teeth on the outer side anteriorly. The vomerine band does not extend so far backwards but is wider than either of the maxillary bands; the shape of the band, however, differs *inter se*, being in the larger example subclaviform, in two of the smaller lanceolate, and in the remaining one foliate; while, therefore, the length and width of this band may in some cases be used as a distinctive character, it is evident that the shape is variable and consequently of no significance.

Taking Günther's "*Synopsis of the Species*"* as a basis of comparison, we find that my 'specimen *a*' belongs to group i., section A, subsection 2, in which "the length of the head is nearly equal to the distance between the commencements of the dorsal and anal fins," while 'specimens *b-d*' belong to subsection 3 of the same group, in which "the length of the head is conspicuously more than the distance between the commencements of the dorsal and anal fins."

In the first subsection referred to are placed *Anguilla labiata*, Peters, from the east coast of Africa, and *A. fidjiensis*, Günther, from the islands of that name. Omitting the former on account of its geographical distribution, we find that our specimen agrees fairly well with *fidjiensis*, the comparative length of the pectoral fin—a character on which I am not disposed to place much reliance—being the principal difference, while the anterior insertion of the dorsal fin is similar in both.†

To subsection 3 *Anguilla bengalensis*, Gray, and *A. reinhardtii*, Steindachner, are assigned by Günther, the former being described as "very closely allied to *A. latirostris*," although that species, which is identical with *A. anguilla*, is referred to a different section of the group, while *A. latirostris* and *A. anguilla* are themselves allotted to different subsections. The only dif-

* Catalogue of Fishes, viii. p. 24, 1870.

† Writing of *Anguilla Mauritana*, Günther remarks (*loc. cit. p. 26*):—"The principal character by which this species may be recognised is the advanced position of the dorsal fin;" a few lines further down he describes *fidjiensis* as having a still more advanced fin.

ferences between *A. bengalensis* and *A. reinhardtii* are the greater length of the tail and the shortness of the vomerine band in the former; but my experience with other apodal fishes—*Leptocephalus* and *Congermurœna*—leads me to the conclusion that too much reliance should not be placed on the first of these characters, which often degenerates into a mere racial distinction; and I can positively assert that any separation of the two species based on the length of the vomerine band is untenable, as that band is constantly shorter than those of the maxillary in the species which we have been accustomed to call *A. reinhardtii* from our waters.* Either, therefore, we have another species of Australian long-finned eel which remains to be re-discovered—a very doubtful supposition—or *A. reinhardtii* should be merged in *A. bengalensis*. Incidentally, I may mention that Day† remarks on a peculiarity of the Indian fish which it shares in common with our species; he writes, it "is much rarer on the hills than in the plains;" similarly all the specimens which I have seen from the mountain region of New South Wales belonged to *A. australis*, and though both species are equally abundant in the Liverpool and Camden districts, the latter is decidedly the scarcer on the coast.

From what has been already pointed out, it is plain that many of the characters which were relied on by Günther in 1870 are of no value for specific distinction, and that if the long-finned anguillids of India, Australia, and the south sea islands are to be kept separate other and more constant characters must be sought.

I shall make no further reference to the subject here, as I hope soon to be in a position to furnish a comprehensive review of the fresh-water eels of Australia and the South Pacific, when the question will be fully dealt with.

2. Kuhlia rupestris hedleyi.

Eleven examples of *Kuhlia* are among the fishes collected; these agree in most respects with *K. rupestris* (Lacépède), Boulenger, but some important and constant differences are

* Compare "Edible Fishes of New South Wales," p. 188, 1893.

† Fauna of British India, Fishes i. p. 87, 1889.

noticeable, even though the latter author allows such an exceptionally wide margin of variation in some of the characters* as to lead to the belief that two or even more species are associated together under the name *rupestris*. In fact, further evidence than that adduced, even by so excellent an authority as Dr. Boulenger, is necessary before we can fully accept his determination of the identity of the five species described by Cuvier and Valenciennes. I may point out that Dr. Jordan, certainly as great an authority on fishes as any, does not admit the identity of the eastern Pacific *K. argyc* with *K. taeniura*, though conceding its affinity, and that the difference in the size of the eye, relied upon by him, is not nearly so marked as in Boulenger's *K. rupestris*.†

While, therefore, the characters relied on by Boulenger in his analysis are accurately represented in our species, the following constant differences between the New Caledonian fish and the Queensland *K. haswellii*, Macleay (considered by Boulenger to be identical with *rupestris*), of which I have examined the types, may be noticed :—

Depth of body $2\frac{2}{3}$ to $2\frac{3}{4}$ in the total length; width of interorbital region $3\frac{1}{2}$ to $3\frac{2}{3}$ in the length of the head; vertical limb of preopercle smooth from just above the angle; fifth dorsal spine $2\frac{1}{10}$ to $2\frac{1}{5}$ in the head; last dorsal spine nearly as long as the fifth; third anal spine much longer than the second, $1\frac{1}{4}$ to $1\frac{2}{5}$ in the longest ray; ventral reaching somewhat beyond the vent; pectoral a little longer than the ventral; upper surface of head without conspicuous rugosities.

Length 130 millimeters ... ... *hedleyi*.

* The following may be taken as instances of the variation referred to :— "Diameter of eye $3\frac{1}{4}$ to 5 in the length of the head; longest dorsal spine $\frac{1}{3}$ to $\frac{2}{5}$ length of head," &c. (*Boulenger, Catal. Fish. i. p. 37, 1895*).

† I trust that I shall be pardoned for remarking that much unnecessary trouble would be avoided and much of the disability, under which colonial biologists and others similarly placed as regards the want of books of reference rest, would be removed, if when giving the synonymy of a genus Dr. Boulenger had mentioned the type of each generic name. This little addition, so easy to him with the British Museum Library at his hand, so exceedingly difficult to us, would greatly increase the value of the catalogues to those workers who have not his facilities for reference.

Depth of body $2\frac{2}{5}$ to $2\frac{1}{2}$ in the total length; width of interorbital region $2\frac{2}{3}$ to $2\frac{3}{4}$ in the length of the head; vertical limb of preopercle denticulated throughout its entire length; fifth dorsal spine $2\frac{1}{3}$ in the head; last dorsal spine much shorter than the fifth; third anal spine a little longer than the second, $1\frac{3}{5}$ to $1\frac{2}{3}$ in the longest ray; ventral not reaching to the vent; pectoral equal to the ventral; upper surface of the head conspicuously rugose.

Length 270 millimeters ... ... *haswellii*.

Of course the disparity in the size of the specimens must be taken into consideration, but even giving this its full value some of the differences, such as that between the width of the interorbital region in the two forms, are quite abnormal.

3. Carassiops guentheri.

Eight examples, the largest 90 millimeters. I have already (p. 787) given my reasons for removing this handsome species from the genus *Asterropteryx* to which it had been ascribed by Bleeker.

4. ? Ophiocara aporos.

Two specimens, the largest 144 millimetres.

5. Eleotris fuscus.

The bulk of the collection belongs to this species, of which examples measuring 166 millimeters were brought back by Mr. Hedley.

6. Trichopharynx crassilabris.

Gobius crassilabris, Günther, Catal. Fish. iii. p. 63, 1861.

Three specimens, the largest 122 millimetres.

I have found it necessary to establish a new genus for this handsome Goby, as follows :—

Trichopharynx, gen.nov.

Gobius sp., Günther, Catal. Fish. iii. p. 63, 1861.

Body robust, cylindrical in front, compressed behind. Head large, wider than deep, with long rounded snout. Mouth wide, with short, nearly horizontal cleft, the lips thick and folded

laterally. Premaxillaries not protractile, the skin continuous in the mesial line with that of the snout; maxillary not reaching to the eye; upper jaw the longer. Teeth in the jaws in a narrow band, slender and recurved, the outer series enlarged, separate, firm; lower pharyngeal teeth setaceous; lips, entire inside of mouth, and tongue papillose. Nostrils approximate, the anterior with a raised rim, the posterior small, round, and simple, well in advance of the eye. Eyes supero-lateral, small, approximate, and somewhat prominent. None of the bones of the head armed. Gill-openings narrow, not extending forwards to below the angle of the preopercle, the isthmus wide; five branchiostegals, the three middle ones in contact basally, widely separated from the outer pair; gill-rakers represented by a few short thick fleshy tubercles. Two dorsal fins, the first with six flexible spines, the second with ten branched rays; anal with ten branched rays, originating behind the second dorsal; ventral inserted below the base of the pectoral, with five rays, the free basal membrane well developed and continuous; pectoral obtusely pointed, with 16 rays, the middle ones the longest; caudal rounded, the peduncle short and deep. Genital papilla moderate, sexually dissimilar, scales irregularly arranged especially in front, those of the tail largest; head naked, except a portion of the occiput and the upper edge of the opercle. No conspicuous series of pores on the head. Vertebræ 26 (11 + 15)). Herbivorous.

Etymology:—*θρίξ* (gen. *τριχος*) a hair or bristle; *φάρυγξ*, throat: in allusion to the setaceous pharyngeal teeth.

Type:—*Gobius crassilabris*, Günther.

Distribution:—Australia; New Caledonia.

The three following species were taken on the reefs:—

Muræniciithys macropterus.

One small example.

Periophthalmus koelreuteri.

Three immature specimens.

Platophrys pantherinus.

A single specimen, 188 mm. in length